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Two new *Heteroconium* species and two other forest microfungi newly recorded from China

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Abstract — Two new species, *Heteroconium annesleae* on decaying branches of *Anneslea hainanensis* and *H. neolitseae* on decaying branches of *Neolitsea obtusifolia,* are described, illustrated, and compared with closely related taxa. Illustrations are also provided of two other anamorphic fungi, *Xenoheteroconium bicolor* and *Craspedodidymum fimbriatum*, which are recorded for the first time from China.

Key words — conidial fungi, Hainan Province, systematics

Introduction

Petrak (1949) erected *Heteroconium* with *H. citharexyli* Petr. as the type species. The genus is distinguished by euseptate, fusiform, cylindrical to oblong conidia that arise in acropetal unbranched chains from solitary conidiophores with monoblastic, terminal, determinate or percurrent conidiogenous cells (Petrak 1949, Ellis 1971, Castañeda et al. 1999, Taylor et al. 2001). Castañeda et al. (2008) provided a key to 16 species of *Heteroconium*, and 19 species are currently accepted. Few other genera produce unbranched acropetal chains of phragmoconidia (which can almost be scolecoconidial). *Lobatopedis* has branched conidiophores with lobed basal cells and rhexolytic conidial secession. *Lylea* has short inconspicuous conidiophores and symmetrical cylindrical distoseptate conidia with rounded ends and extremely thick walls. Its primary conidia may produce lateral conidia that, as in *Xenoheteroconium*, can develop from non-apical cells. *Pirozynskiella* has unbranched acropetal conidial chains but is a tropical mycoparasite of *Asterinaceae.*

Xenoheteroconium was established by Bhat et al. (Bhat & Kendrick 1993) to accommodate *X. bicolor*. The genus is unique in having a bi-coloured

conidiophore, with the darker apical portion developing lateral conidia before seceding and acting as a propagule.

Craspedodidymum Hol.-Jech. (Holubová-Jechová 1972) is typified by *C. elatum* Hol.-Jech., which has branched conidiophores terminating in apically inflated phialides with large funnel-shaped collarettes, producing pale brown aseptate conidia in slimy heads.

Decaying wood in the tropical forests of Hainan Province supports a high level of fungal diversity, and many wood-inhabiting macrofungi and microfungi have been recently discovered there (Ma et al. 2008, Dai et al. 2009, Zhang et al. 2009a,b, Dai & Li 2010). During continuing investigations of saprobic microfungi, numerous conidial species were collected on decaying branches, among which two have morphological characteristics of *Heteroconium*. They differ from any described species and are proposed as new to science. Two other fungi are recorded for the first time from China. The specimens are deposited in HSAUP (Herbarium of the Department of Plant Pathology, Shandong Agricultural University) and HMAS (Mycological Herbarium, Institute of Microbiology, Chinese Academy of Sciences).

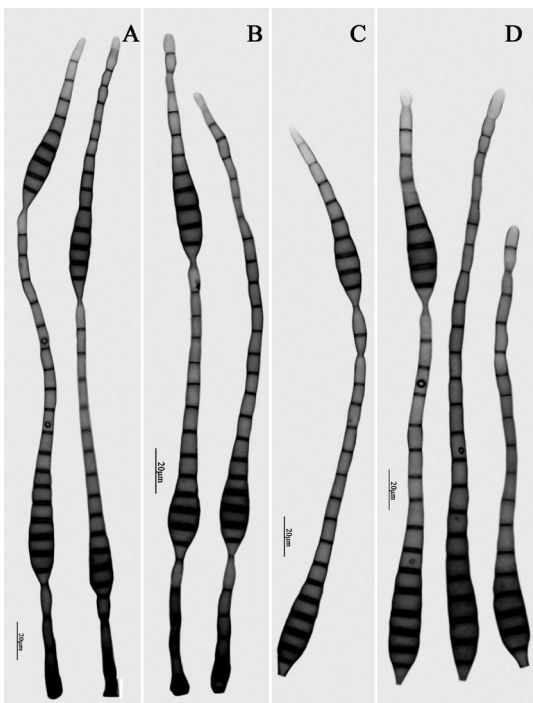

Fig. 1. *Heteroconium annesleae*.
A–B. Conidiophores, conidiogenous cells and conidia. C–D. Conidia.

Heteroconium annesleae S.C. Ren & X.G. Zhang, **sp. nov.** Fig. 1

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Differs from *Heteroconium decorosum* in producing much larger (95–300 × 9.5–15 μm) and differently shaped conidia.

Type: China. Hainan Province: tropical forest of Bawangling, on decaying branches of *Anneslea hainanensis* (Kobuski) Hu (*Theaceae*), 15 May 2011, Sh.C. Ren (**holotype**, HSAUP H8492; **isotype** HMAS 146160).

Etymology: in reference to the host genus.

Colonies on natural substratum effuse, hairy, dark brown. Mycelium partly superficial, partly immersed, composed of septate, smooth, pale brown, branched, 2–5 μm wide hyphae. Conidiophores macronematous, mononematous, solitary, erect, unbranched, cylindrical, straight, smooth, brown, 3–5-septate, 55–65 × 4.5–8.5 μm. Conidiogenous cells integrated, terminal, monoblastic, cylindrical, tapered to a truncate apex, determinate, smooth, brown. Conidial secession schizolytic. Conidia acrogenous, holoblastic, blastocatenate, obclavate, tapering gradually towards the apex, base truncate, smooth, 9–24-euseptate, brown, apical cells pale brown, 95–300 × 9.5–15 μm.

Notes: *Heteroconium annesleae* is similar to *H. decorosum* R.F. Castañeda et al. (Castañeda et al. 1999) in conidial morphology, but differs from the latter in conidial shape, size, and number of septa. In *H. decorosum* the conidia are navicular, broadly fusiform to obclavate, 20–30 × 3–5 μm, and 3–6-septate.

Heteroconium neolitseae S.C. Ren & X.G. Zhang, **sp. nov.** Fig. 2

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Differs from *Heteroconium tropicale* by longer (80–95 μm) conidia with more septa (9–16) and from *H. arundicum* by narrower (4–6 μm) conidia with more septa.

Type: China. Hainan Province: tropical forest of Bawangling, on decaying branches of *Neolitsea obtusifolia* Merr. (*Neolitsea*). 8 May 2011, Sh.C. Ren, (**holotype** HSAUP H8375; **isotype** HMAS 146161).

Etymology: in reference to the host genus.

Colonies on natural substratum effuse, hairy, dark brown. Mycelium partly superficial, partly immersed, composed of branched, septate, smooth, pale brown, 2–4 μm wide hyphae. Conidiophores macronematous, mononematous, solitary, erect, unbranched, straight, smooth, brown, 9–13-septate, 80–95 × 4.5–6.5 μm. Conidiogenous cells integrated, terminal, monoblastic, cylindrical, tapered to a truncate apex, determinate, smooth, brown. Conidial secession schizolytic. Conidia acrogenous, holoblastic, blastocatenate, cylindrical or fusiform, base truncate, smooth, 9–16-euseptate, with a wide black band at each septum, brown, unevenly pigmented, pale brown ends, 50–85 × 4–6 μm.

Notes: *Heteroconium neolitseae* is similar to *H. tropicale* R.F. Castañeda & W.B. Kendr. (Castañeda & Kendrick 1990) and *H. arundicum* Chowdhry (Chowdhry

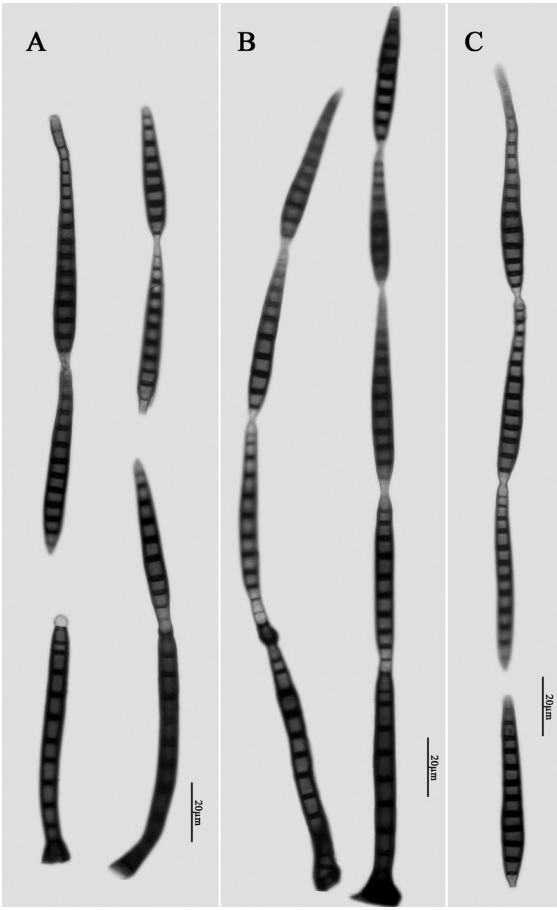

Fig. 2. *Heteroconium neolitseae.*
A–B. Conidiophores, conidiogenous cells and conidia. C. Conidia.

1980) in producing smooth cylindrical to fusiform conidia. However, *H. tropicale* is distinguished by conidia that are shorter (26–52 μm) and have fewer (3–6) septa and *H. arundicum* differs in conidia that are wider (8–12 μm) and with fewer (1–10) septa. In addition, *H. neolitseae* has a black band at each septum of conidia, a feature not found in either *H. tropicale* or *H. arundicum*.

Xenoheteroconium bicolor Bhat, W.B. Kendr. & Nag Raj, Mycotaxon 49: 81 (1993)
Fig. 3

Colonies on natural substratum effuse, dark brown, velvety. Mycelium mostly immersed in the substratum, composed of branched, septate, pale

Fig. 3. *Xenoheteroconium bicolor*.
Conidiophores, primary conidia in branched chains (indicated by white arrows) and secondary conidia (bases indicated by black arrows).

brown to brown, smooth-walled hyphae. Conidiophores macronematous, mononematous, simple, unbranched, erect, straight or slightly flexuous, cylindrical, smooth, lower part pale brown, upper part brown, with a sharp line of demarcation between the two levels of pigment, 5–7-septate, 160–195 × 3–4 μm, broadening to 5–6 μm wide at the lobed base, regenerating percurrently from broken ends. Conidiogenous cells monoblastic, integrated, terminal and intercalary in the upper part of the conidiophore axis and in primary conidia, brown, cylindrical or conical. Conidia holoblastic, phragmosporous, dry, brown; primary conidia fusiform or obclavate, straight, 2–4-euseptate, slightly constricted at the septa, 15–37 × 3.5–4.5 μm; secondary conidia cylindrical or fusiform, truncate at the base, tapering toward the tip, straight, 5–7-euseptate, slightly constricted at the septa, 35–80 × 3–4 μm.

Specimen examined: **China. Hainan Province**, tropical forest of Bawangling, on decaying branches of unidentified plant, 8 May 2011, Sh.C. Ren, HSAUP H8345; HMAS 146162.

Notes: Only one species is currently accepted in *Xenoheteroconium*. The morphology of our specimen overlaps with the type description by Bhat & Kendrick (1993).

Craspedodidymum fimbriatum Bhat & W.B. Kendr., Mycotaxon 49: 33 (1993) Fig. 4

Colonies gregarious, effuse, velvety, dark brown to black. Mycelium mostly immersed in the substratum, composed of septate, smooth, pale brown, branched hyphae. Conidiophores mononematous, fasciculate in groups, erect, straight or flexuous, unbranched, 4–8-septate, smooth, brown, paler towards the apex, percurrently regenerating, 135–210 × 4–6 μm. Conidiogenous cells monophialidic, terminal, integrated, cylindrical to clavate, slightly inflated and rounded at the apex, which bears an inconspicuous collarette, pale brown to brown. Conidia blastic-phialidic, globose, non-septate, thick-walled, pale brown, 19–22 μm diam., with numerous acellular, fibrillose, curved appendages forming a pile or coat on the surface; accumulating in colourless

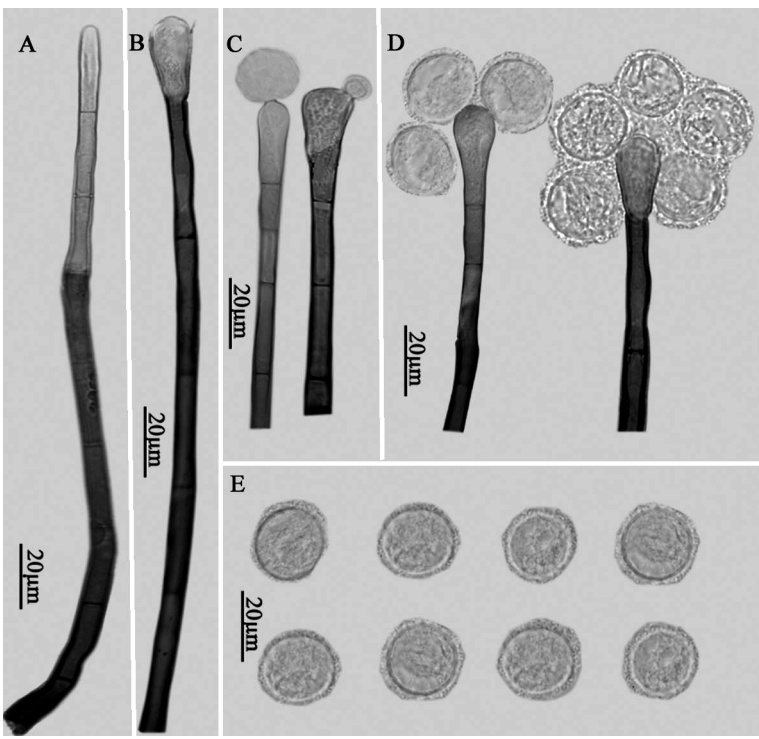

Fig. 4. *Craspedodidymum fimbriatum*. A–B. Conidiophores and conidiogenous cells. C–D. Conidiophores and conidia. E. Conidia.

slimy masses at the apex of the conidiophore, or sometimes adhering to the sides of conidiogenous cells after secession.

Specimen examined: **China. Hainan Province**, tropical forest of Bawangling, on decaying branches of unidentified plant, 8 May 2011, Sh.C. Ren, HSAUP H8405; HMAS 146164.

Notes: *Craspedodidymum fimbriatum* is unique in possessing a cylindrical to clavate conidiogenous cell, which is inflated and rounded at the apex and with an inconspicuous collarette, and slimy globose aseptate conidia with a densely fibrillose surface. The size ranges of conidia and conidiophores in our specimen overlap with those of the type specimen described by Bhat & Kendrick (1993), and other features of this taxon also match those of the original species.

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